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The role of occupational and physiotherapy in multi-modal approach to tackling delirium in the intensive care

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Abstract

The presence of delirium within critical care remains a long-standing challenge for patients and clinicians alike. A myriad of pre-disposing and precipitating factors lead to this patient cohort being high risk for developing delirium during their critical care stay. Until now, non-pharmacological management of these patients usually encompasses a 'bundle' of principles to reduce delirium days. These bundles have limited focus on the entire multi-disciplinary team (including occupational therapists and physiotherapists) who could assist with the reduction of delirium. The purpose of this analysis is to review the current literature and develop a mnemonic, which may help facilitate collaborative working for patients with delirium. Electronic databases were searched for non-pharmacological managements of delirium within intensive care settings, after 2006. Critical appraisal using Critical Appraisal Skills Programme methodology was completed by the author. Multi-intervention approaches and bundles are successful at reducing delirium days, and in some cases, reducing hospital length of stay. The key components of these bundles include spontaneous breathing trials, daily sedation holds, addressing pain relief, early mobilisation and to a small extent normalisation of a daily routine. There is limited research into the role of therapy within this patient group, but there is a role for cognitive therapy, functional tasks, and a greater rehab emphasis within other patient populations such as stroke and elderly care. The critical care population have similar rehabilitation needs to these groups, and therefore would benefit from similar treatment plans. Critical care patients with delirium may benefit from a range of additional therapeutic activities to reduce the duration of delirium. The D.E.L.I.R.I.U.M mnemonic has been developed to encompass all the key elements of current delirium research in a simplistic memorable fashion. Further work is needed to trial the usefulness of the mnemonic in clinical practice to enable the entire multi-disciplinary team work collaboratively to reduce delirium with the intensive care.

Keywords

Delirium, bundles, occupational therapy, physiotherapy

Introduction

Intensive care units (ICU) present a challenging environment for critically unwell patients for a myriad of reasons, including sickness, reduced mobility, medication, sedation and the environment itself. As a result of this, many patients admitted to ICU may suffer long-term difficulties, such as cognitive dysfunction, post-traumatic stress disorder, post ICU syndrome, cognitive deficits and mobility problems.[1]

Delirium is defined as a 'disturbance of consciousness characterised by an acute onset of brain dysfunction with an impaired cognitive function, inattention, a disorganised thinking and a fluctuating course'.[2] There are three subtypes of delirium – hypoactive, hyperactive and mixed picture. The incidence of delirium within ICU is split according to subtypes; 25% incidence of hypoactive delirium, 11% of mixed delirium and 3% of hyperactive delirium. The proportion of subtypes of delirium is 57% hypoactive, 35% mixed and 9% hyperactive.[3] Delirium is associated with an increase in mortality, long-term cognitive impairments and reliance on long-term care.[4–6]

The purpose of this article is to review current bundles, guidelines and tools for delirium in the ICU, provide a specific focus on the role of occupational therapy and physiotherapy within delirium in the ICU and discuss the challenges of demonstrating any measurable improvement in a multi-modal treatment pathway. It will also introduce a framework delivered through a

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mnemonic, which may provide a holistic approach to the non-pharmacological management of delirium.

Delirium bundles, guidelines and tools

Measurement of risk factors

Delirium is a result of an interaction between predisposing and precipitating factors. All reviews of risk factors focus on the pre-disposing factors; however, arguably, some of these could be described as non-modifiable risk factors. Four predisposing risk factors have been associated with ICU delirium: pre-existing dementia, history of hypertension, alcoholism and a high APACHE II score on admission.[7]

PRE-DELIRIC (PREdiction of DELIRium in ICu) is a tool which has been validated in 13 ICU settings, across seven countries. The purpose is to predict delirium as diagnosed by confusion assessment method for the intensive care unit (CAM-ICU).[8,9] It uses 10 risk factors available within the first 24 h of admission to ICU: age, APACHE II score, admitting speciality, coma, infection, metabolic acidosis, use of sedatives and morphine, urea concentration and urgent admission. This tool has a greater correlation with increasing number of days in ICU.

A systematic review of 33 studies investigating delirium risk factors were graded accordingly to a checklist. Due to the studies heterogeneity and with only 6/33 completed in a clinical setting; only descriptive results of physiological pre-disposing factors were presented.[10]

Measurement of delirium and delirium screening

Assessment of delirium in ICU is an essential part of UK practice.[11] Routine screening of delirium should occur at least once per shift to ensure early detection and diagnosis of delirium.[7] Without appropriate identification, patients and families may miss out on important interventions such as cognitive therapy and education.

There are two frequently used validated outcome measures to assess delirium within the ICU – the CAM-ICU[4] and the intensive care delirium screening checklist (ICDSC).[12] Both the CAM-ICU and the ICDSC have high validity, inter-rater reliability, sensitivity and specificity.[7,13] The CAM-ICU performed better across a cohort of 1523 patients, with a pooled specificity of 0.96 compared to 0.75 in terms of odds ratio.[13] The challenge with the commonly used CAM-ICU is that it captures a single time during the 24-h or 12-h period. A better way of measuring delirium would be to use a validated chart review alongside the snapshot of the CAM-ICU.[14–16]

Delirium guidelines and 'bundles of care'

Pharmacological and non-pharmacological interventions are married together within delirium guidelines to provide a holistic approach, enabling the MDT to work together. The 'Clinical Practice Guidelines for the management of pain, agitation and delirium in adult patients in the intensive care unit' were produced following an extensive graded systematic review and subsequent development of the care bundle.[7,17] Recommendations are given according to the strength of the evidence. There is particular emphasis on assessment, managing pain, goal directed sedation including use of sedatives and daily sedation holds, early mobilisation (EM) and promotion of sleep. There are no recommendations for the use of either anti-psychotic agents or alpha2agonists for the treatment of delirium.

'Guidelines for the Provision of Intensive Care Services' specify that patients must be routinely screened for delirium, and treatment must consider both pharmacological and non-pharmacological interventions.[11] The 'Guidelines for Detection, Prevention and Treatment of Delirium' focus primarily on the pharmacological management of delirium with minimal focus on the non-pharmacological management; this guideline is currently being updated.[18]

The 'Awakening and Breathing Co-ordination, Delirium monitoring/management and Early Exercise/mobility bundle' (ABCDE) has been shown to reduce mechanical ventilation, reduced delirium (post 48.7% vs 62.3% pre-intervention), increase participation with EM (mobilising out of bed) and reduced hospital mortality.[19,20] The authors provided recommendations for targeted sedation, spontaneous breathing trials, delirium monitoring and EM. Interestingly, for every 10% increase in compliance with the entire bundle, there was a 15% increase in hospital survival.[21] The key components of this bundle could be considered as routine care in ICU settings across the United Kingdom (Table 1).

What is the role of therapy within the MDT management of delirium?

Sleep hygiene within ICU

Quality of sleep and circadian rhythm in relation to delirium has been widely discussed within the literature. There is a shift towards light sleep patterns, changes in melatonin production, and excess time spent recumbent, diminish the natural circadian rhythm.[22] Sleep hygiene is defined as 'a variety of practices and habits necessary to allow good nighttime sleep quality and full daytime alertness'.[23] Multi-intervention strategies to improve sleep hygiene have been shown to improve delirium outcomes.[1,24] The use of re-orientation strategies, the simple measurement of nighttime light, noise and sleep interruptions within a quality improvement project has shown to improve delirium outcomes.[24] A separate project incorporating noise and light reduction, alongside increasing mobility, ear plugs and eye masks showed a significant reduction in the incidence of

Table 1. Bundles and guidelines.

Bundle name	Authors	Recommendations
Awakening and breathing coordination, delirium monitoring/management and early exercise/mobility bundle	Balas et al.[19]	Daily sedation hold, spontaneous breathing trials, assess for delirium, encourage early mobility and involve family
Core standards for intensive care	Intensive Care Society[18]	Daily assessment of delirium, key provisions in place to reduce delirium
NICE delirium: prevention, diagnosis and management	NICE[31]	Recommendation of using routine, patient belongings and encouraging mobility/participation in activity
Clinical practice guidelines for the management of pain, agitation and delirium in adult patients in the intensive care unit	Barr[7]	All patients must be monitored for pain using validated scale, recommend non-benzodiazepine sedatives to target light sedation where possible, routine monitoring of delirium, no recommendations of the use of haloperidol, daily sedation holds, promote sleep by optimising environment, interdisciplinary approach

delirium, but not of perceived sleep quality, suggesting that improvements in delirium were due to a combined approach rather than sleep alone.[1] The current research project Sleep in the Icu: Limiting Elements of Noise in the Critical Care Environment (which our unit is participating in) will provide further evidence into sleep hygiene and delirium.

Role of physiotherapy

We have ascertained that sleep may help with reduction of delirium when combined with several approaches. This is the first step to normalising a patients day. The next phase is to increase mobility. In a randomised conrrolled trial (RCT) with 104 patients, it was found that those in the EM intervention group had better functional outcomes (measured using the Barthel) at hospital discharge, a significant reduction in mechanical ventilation ($p = 0.02$), and a significant reduction in days spent in delirium during the hospital admission.[25] This shows a clear link between EM including passive movement exercises and a reduction in delirium. Furthermore, a quality improvement project in a single ICU demonstrated a signiifcant reduction in delirium and improvements in functional outcomes, and reduction in length of stay by implementing an EM program.[26]

With ever increasing pressures within acute hospitals, time to promote and encourage a 'rehab' ethos is reduced. Despite increasing evidence highlighting the benefits of activity to reduce the effects of immobility within a hospital setting, patients are not encouraged to return to their usual activity levels quickly, causing mental and physical deconditioning and further pressure on the health and social care systems.[27–29] Therapy teams have a large part to play in education to the wider MDT to facilitate a '24-h approach to rehab', and encourage the MDT to optimise sleep hygiene, mobility, functional and cognitive activities.

Physiotherapists are ideally placed to provide a link between the immediate ICU MDT and the occupational therapists (OTs). A full assessment of the patients rehabilitation needs must be completed within 24 h admission to ICU, and include a physical and cognitive component as well as assessment for delirium.[11] During daily rehabilitation sessions, re-orientation should occur. The basics of these sessions are often documented in patient diaries, which despite current insufficient evidence, may provide support in long-term cognitive dysfunction and post-traumatic stress.[30]

Despite lack of evidence or literature into safety of mobilising a patient with delirium, it is important nonetheless to mention. Physiotherapists are ideally placed in using their clinical reasoning skills, to work alongside the MDT to assess the safety of mobilising patients with delirium.

The role of OTs

OTs play a key role in assessing and rehabilitating cognition, particularly in the brain injury and stroke population; however, relatively little research has been completed within ICU. We know that many patients suffer long-term cognitive impairments following critical illness; therefore, it is essential that we incorporate cognitive therapy into our early critical illness pathway.[31] Unfortunately, at this stage, the few research studies into this do not support this theory. A pilot study investigated the use of twice daily cognitive therapy alongside usual care physiotherapy and a 12-week cognitive programme at home for the intervention group.[32] Although this demonstrated that early intervention is safe, there was no improvement in executive functioning, delirium free days, ventilator free days or length of stay.

These same conclusions have been drawn in a pilot RCT comparing routine therapy with EM and orientation exercises.[33] There was no improvement in incidence of delirium, delirium free days or length of stay; however, the study was underpowered in view of their baseline delirium rate (4.9%), and assessment was not through a validated tool for ICU at appropriate intervals. Despite this, it is difficult to draw significant conclusions from a single intervention such as cognitive therapy, as it is widely accepted that a multi-modal approach is most successful at reducing delirium.

Occupational therapy plays a role in education, improving cognition, memory, sleep hygiene and maintaining function. It is well observed that survivors of ICU suffer from cognitive difficulties post discharge regardless of the presence of delirium.[34] A more proactive approach could provide patients with better tools to manage upon discharge. Therefore, early identification and handover to OTs is essential for patients leaving the intensive care setting.

Creation of a new MDT bundle

Delirium occurs for a huge array of reasons, some of which are manageable and reducible. As holistic practitioners, therapists with ICUs are ideally placed to promote the principles of 'a normal day'. The mnemonic – D.E.L.I.R.I.U.M (as seen below), created by the author, captures the key principles of this, in an attempt to reduce rates of delirium. Further research is needed across the ICU environment into not only the application of this mnemonic, but also more widely to further explore the role of therapists within delirium in the ICU.

Drugs	Remove any deliriogenic drugs
Environment	Reduce noise, reduce excess stimulus, family interaction, bed space
Light	Allow appropriate lighting through day and night, including natural light
Initiate cognitive tasks	Start cognitive tasks early, referral to occupational therapy. Use appropriate outcome measures
Routine	Access to clock, encourage 'normal' daytime activity including functional tasks, timetables, both physical and non-physical activities. Set rest times. '24-h approach to rehab'
Integrate MDT	Refer to SLT for communication, consider older persons' medicine input as appropriate
Under hydration/nutrition	Integrate food and fluids into daily routine
Mobility	Mobilise through sitting out, rehab sessions, stryker chair and motomed as soon as patient is stable

Conclusion

The evidence suggests that early goal-directed multi-component, multi-intervention, multi-disciplinary approach provides the best management for patients with delirium. Patients who develop delirium may suffer long-term cognitive deficits and functional difficulties. Whilst the evidence remains uncertain as to the benefits of early intervention for physiotherapy and occupational therapy, we still need to recognise the impact delirium has on patients and families, and provide strategies to reduce it. The D.E.L.I.R.I.U.M mnemonic may provide a solution to utilising the MDT to manage delirious patients.

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